

REMARKS:

Claims 17, 20 and 21 are pending in the application. Reexamination and reconsideration of the application, in view of the foregoing remarks, are respectfully requested.

Admission is requested under 37 C.F.R. § 1.116(a) as presenting rejected claims in better form for consideration on appeal.

Claims 17 and 20-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Regler et al. (U.S. Patent No. 4,161,167). Applicant respectfully traverses the rejection.

Claim 17 of the present invention is:

17. A tool comprising a sapphire monocrystal body having at least two faces defining a sharp edge, one face formed by a working plane and a second face formed by a cleavage plane parallel to a plane R of the sapphire monocrystal, the angle between the working plane and the cleavage plane being less than about 70 degrees.

Regler et al. is directed to lap cutting blades that are useable for multiple lap cutting of solid materials, such as semiconductor rods. (Regler et al., Abstract.) The blades each have a generally rectilinear cutting edge, the length of which is 1-75 times the thickness of the blade, as measured at its cutting edge. (Regler et al., Abstract.) The cutting edge of each blade has rectilinear edge portions separated by a plurality of notched edge portions which, in turn, define a plurality of recesses which encompass 5 to 25% of the total blade length and 5 to 40% of the effective operating length of the blade. (Regler et al., Abstract.) The notched blade edge portions define a notch angle of between 20 and 80 degrees, as measured between the tangent thereto at its point of intersection with the rectilinear cutting edge portion and a line perpendicular to the rectilinear cutting edge portion. (Regler et al., Abstract.) In Regler et al., the blades are made of Low cost types of steel are available for the blade material, for example, spring steel having a tensile strength of about 120 to 250 kp per mm², preferably, 200 to 240 kp per mm². It is to be

understood that the free operating length of the blade means the blade portion which is freely clamped between the retaining elements and which is moved through the material to be cut. Thereby, the height of the blade is about 5 to 10 mm, particularly favorable is the dimension of about 5-7 mm having a thickness of about 100-300 μm . (Regler, at col. 2, 42-44).

The Office states however, that, "The rejection is not concerned with these claims, they are concerned with a sapphire plate that the blades are shown to be used to cut." Applicant has carefully reviewed Regler, and has found only a single reference to sapphire, which is:

"The set of blades which are used in frame saws or multiple lap cutting machines for cutting semiconductor materials, for example, silicon or germanium or oxidic substances like sapphires or rubies consist of a plurality of individual blades which are clamped in a frame and spaced apart from each other by means of spacer disks."
(Col. 1, lines 20-26.)

The Office argues that "A sapphire plate will inherently possess the claimed planes as shown above."

Applicant respectfully disagrees, claim 17 is directed to a tool comprising "a sapphire monocrystal body having at least two faces defining a sharp edge, one face formed by a working plane and a second face formed by a cleavage plane parallel to a plane R of the sapphire monocrystal, the angle between the working plane and the cleavage plane being less than about 70 degrees." Applicant first notes that nothing in Regler teaches that the Sapphire body is a monocrystal--- polycrystalline or microcrystalline Sapphire are also known. As such, the Regler reference does not inherently disclose monocrystal sapphire. Second, as pointed out in Applicant's Specification, the Sapphire monocrystal is a hexagonal system having a variety of crystallographic axes including a plane C (0001), a plane A (11-20) and a plane R (1-102). (Specification, at p. 8, lines 16-24). Nothing in Regler can be fairly said to either teaches or suggests a tool with "a second face formed by a cleavage plane

parallel to a plane R of the sapphire monocrystal." Regler is totally silent as to the importance of cutting parallel along specific crystallographic axes. In fact, Regler doesn't teach or suggest cutting with respect to any crystallographic axis. As such, nothing in Regler can be fairly said to either teach or suggest a face formed parallel to a cleavage plane R. Nor is this inherently done. Regler could just as easily be cutting along the planes C or A or at any angle to either of these planes. Because Regler does not necessarily cut parallel to the R plane, Regler cannot be said to inherently teach this limitation. Therefore, withdrawal of the rejection and allowance of claim 17 is respectfully requested.

Claim 20 requires, "a sapphire monocrystal having a major face.... and a microcrack line on the major face parallel to the plane R." As with claim 17, Regler is totally silent as to the importance of cutting parallel along specific crystallographic axes. Thus, nothing in Regler can be fairly said to either teaches or suggests a tool with "microcrack line on the major face parallel to the Plane R." Nothing in Regler et al. teaches or suggests a monocrystal sapphire with a microcrack on the major face parallel to the plane R. as is required by claim 20. Regler could just as easily be cutting along the planes C or A or at any angle to either of these planes. Because Regler does not necessarily place a microcrack parallel to the R plane, Regler cannot be said to inherently teach this limitation. Since Regler et al. fails to teach or suggest each claim limitation, Regler et al. cannot anticipate claim 20, and claim 20 patentably distinguishes over Regler. Withdrawal of the rejection is respectfully requested.

Claims 17 and 20-21 stand rejected under 35 U.S.C. § 102(b) as having been anticipated by Kato et al. (U.S. Patent No. 4,662,124). The Office argues, "Kato shows in Figures 3 and 10 a sapphire monocrystal plate having a major face, an R plane, and C planes with an inclination angle less than about 70 degrees as required by the claims." (Office action, page 3, last two lines of page.). Applicant respectfully submits that Kato fails to teach several critical elements of claims 17 and 20-21 and as such Kato cannot anticipate the claimed invention.

As amended, Claim 17 is directed to a tool comprising a sapphire monocrystal body having at least two faces defining a sharp edge, one face formed by a working plane and a second face formed by a cleavage plane parallel to a plane R of the sapphire monocrystal, the angle between the working plane and the cleavage plane being less than about 70 degrees.

Kato et al. details a method of grinding sapphire wafers along their R plane to minimize warpage. Applicant notes that Kato is specifically directed to a sapphire wafer. Nothing in Kato suggests the desirability or usability of the ground wafers of Kato for "sapphire monocrystal body having at least two faces defining a sharp edge."

Applicant points out that sapphire wafer 14 in Figure 12, the sapphire monocrystal wafer 23 in Figure 14 and sapphire wafer of Figure 9 all show a wafer in which the top plane of the wafer is perpendicular to the side of the wafer (i.e. 90°). Regarding Figure 3 of Kato et al. to which the Examiner refers, that Figure shows a sapphire wafer with the C planes shown as diagonal lines 3. The C planes are the atomic net planes (0001) in the hexagonal crystal structure (Kato, Col. 2:17-20). Lines 3 are merely imaginary representations of these planes. The upper left hand edge of the sapphire wafer of the figure (where the imaginary plane is extended to demonstrate the 57.6° relationship) clearly has a right angle (90°) corner. The right hand edge of the wafer might appear to follow the C plane. Because the imaginary extension of the upper left edge shows an angle of 57.6°, simple geometry tells us that the upper right hand edge of the sapphire wafer must have an angle of 122.4° (i.e., 180° minus 57.6°). As such, the requirement of amended claim 17 that the sapphire body be comprised of "two faces defining a sharp edge, one face formed along a working plane and a second face formed along a cleavage parallel to a plane R of the sapphire monocrystal. . . the angle between the working plane and the cleavage plane being less than about 70 degrees" is not necessarily present in the sapphire wafer of Kato et al. As such, Kato et al. cannot anticipate the claimed invention. Applicant believes that the presently claimed

invention patentably distinguishes over Kato et al. and amended Claim 17 should be allowed.

Applicant contends that the sapphire body of Kato et al. does not inherently possess the limitation that requiring "two faces defining a sharp edge, one face formed along a working plane and a second face formed along a cleavage parallel to a plane R of the sapphire monocrystal. . . the angle between the working plane and the cleavage plane being less than about 70 degrees" as required by amended Claim 17. Other than purely imaginary C-planes, the silicon wafers all show an angle greater than or equal to 90°, and clearly do not fall within the scope of the claims.

Amended Claim 20 is limited to sapphire monocrystal plate having "a microcrack on the major face parallel to the plane R for starting to cleave the plate". Kato is directed to grinding a monocrystal wafer. Kato neither teaches nor suggests placing a microcrack in the wafer as is required by present claim 20. Further, nothing in Kato either teaches or suggests placing the microcrack "on the major face parallel to the plane R for starting to cleave the plate." As such, Applicant believes that Amended Claim 20 patentably distinguishes over the cited prior art. Allowance of amended Claim 20 is respectfully requested.

Claim 21 depends from claim 20 and is patentable for at least the same reasons as claims 20. Withdrawal of the rejection and allowance of claim 21 is respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

Applicant believes the foregoing amendments place the application in condition for allowance and early, favorable action is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles telephone number (213) 337-6810 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

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